

What Is Claimed Is:

- 1 1. A scalable quadrature amplitude modulation (QAM)
2 communication method, comprising the steps of:
 - 3 distributing bit data in different bit positions for
4 transmission;
 - 5 combining the bit data in different bit positions into a
6 combined signal;
 - 7 modulating the combined signal according to a quadrature
8 amplitude modulation (QAM) technique into a
9 modulated signal; and
 - 10 broadcasting the modulated signal over a channel.
- 1 2. The communication method according to claim 1,
2 further comprising the steps of:
 - 3 receiving the modulated signal transmitted over the
4 channel; and
 - 5 determining whether to demodulate all data on the bit plane
6 or a portion of the data on certain bit positions
7 according to the transmission quality of the received
8 signal.
- 9 3. The communication method according to claim 1,
10 wherein distributing the bit data in different bit positions
11 further comprises the steps of:
 - 12 sending different types of media access control (MAC)
13 messages;
 - 14 generating different types of bit data using different
15 types of channel encoding methods to encode the
16 different types of MAC messages; and

17 assigning the different types of bit data to different bit
18 positions.

1 4. A communication method of scalable quadrature
2 amplitude modulation (QAM) for a scalable QAM communication
3 system comprising a transmitter and a plurality of clients,
4 comprising the steps of:

5 the transmitter distributing bit data in different bit
6 positions for transmission;

7 the transmitter combining the bit data in the different bit
8 positions into a combined signal;

9 the transmitter modulating the combined signal according
10 to a quadrature amplitude modulation (QAM) technique
11 into a modulated signal; and

12 the transmitter broadcasting the modulated signal over a
13 channel.

1 5. The communication method according to claim 4,
2 further comprising the steps of:

3 each client receiving the modulated signal transmitted
4 over the channel; and

5 each client determining whether to demodulate all data on
6 the bit plane or a portion of the data on certain bit
7 positions according to the transmission quality of
8 the received signal.

1 6. The communication method according to claim 4,
2 wherein the transmitter distributing the bit data in the
3 different bit positions further comprises the steps of:

4 sending different types of media access control (MAC)
5 messages;

6 generating different types of bit data using different
7 types of channel encoding methods to encode the
8 different types of MAC messages; and
9 assigning the different types of bit data to the different
10 bit positions.

1 7. The communication method according to claim 4,
2 wherein each client receives the data transmitted
3 over the channel from the transmitter after
4 completing a registration procedure.

1 8. The communication method according to claim 7, the
2 registration procedure further comprising the steps of:
3 the transmitter broadcasting a signal for registration
4 over the channel;
5 each of the clients determining a type of QAM modulated
6 signal for receiving and a demodulation technique for
7 demodulating the received signal according to the
8 transmission quality of the signal for registration
9 received by the client;
10 the client sending an uplink request and the demodulation
11 technique used to the transmitter;
12 the transmitter receiving the uplink request from the
13 client and building a client database in order to
14 complete the registration; and
15 the transmitter sending packets for the client using a MAC
16 message with a corresponding type.

1 9. A scalable quadrature amplitude modulation (QAM)
2 transmitter comprising:
3 a media access controller, for sending different types of
4 MAC messages;

5 a plurality of encoders, for generating different types of
6 bit data using different types of channel encoding
7 methods to encode different types of MAC messages;
8 and
9 a bitmap device, for assigning the different types of bit
10 data to different bit positions, and combining the
11 data of different bit positions to generate a first
12 component signal.

1 10. The transmitter according to claim 9, further
2 comprises:

3 a second set of encoders, for generating different types
4 of second bit data using different types of channel
5 encoding methods to encode the different types of MAC
6 messages;
7 a second bitmap device, for mapping different types of the
8 second bit data to different bit positions, and
9 combining the data of different bit positions to
10 generate a second component signal; and
11 a quadrature amplitude modulator, for receiving the first
12 and the second component signals and modulating the
13 first and the second component signals using the QAM
14 technique.

1 11. A scalable quadrature amplitude modulation (QAM)
2 communication system comprising:

3 a transmitter, for distributing bit data in different bit
4 positions for transmission, combining the bit data
5 in different bit positions, modulating the combined
6 bit data according to a quadrature amplitude
7 modulation (QAM) technique into a modulated signal,

8 and then broadcasting the modulated signal over a
9 channel; and

10 a plurality of clients, receiving a signal from the
11 channel, and determining whether to demodulate all
12 data on the bit plane or a portion of the data on
13 certain bit positions according to the transmission
14 quality of the received signal.

1 12. The scalable QAM communication system according to
2 claim 11, wherein the transmitter further comprises:

3 a media access controller, for sending different types of
4 MAC messages;

5 a plurality of encoders, for generating different types of
6 bit data using different types of channel encoding
7 methods to encode different types of MAC messages;

8 a bitmap device, for assigning different types of the bit
9 data to different bit positions, and combining the
10 data of the different bit positions to generate a
11 first component signal;

12 a second set of encoders, for generating different types
13 of second bit data using different types of channel
14 encoding methods to encode the different types of MAC
15 messages;

16 a second bitmap device, for mapping different types of the
17 second bit data to different bit positions, and
18 combining the data of the different bit positions to
19 generate a second component signal;

20 a quadrature amplitude modulator, for receiving the first
21 and the second component signals and modulating the

22 first and the second component signals using the QAM
23 technique; and
24 an antenna, for transmitting the signals modulated using
25 the QAM technique to a channel.

1 13. The scalable QAM communication system according to
2 claim 11, wherein each of the clients comprises:
3 an antenna, for receiving an input signal from the channel;
4 a quadrature amplitude demodulator, for demodulating the
5 input signal into a first symbol and a second symbol,
6 wherein the first and the second symbols are formed
7 by an equal number of bits;
8 a de-bitmap device, for partitioning each bit of the first
9 and the second symbols according to the bit position
10 of each bit; and
11 a multi-mode decoder, for determining whether to
12 demodulate all data on the bit plane or data on a
13 portion of the bit positions according to the
14 transmission quality of the input signal.

1 14. The scalable QAM communication system according to
2 claim 11, wherein the transmitter broadcasts a signal for
3 registration over the channel.

1 15. The scalable QAM communication system according to
2 claim 14, wherein each of the clients determines the type of QAM
3 modulated signal to receive and the type of demodulation method
4 for demodulating the received signal according to the
5 transmission quality of the registration signal received by the
6 client, and sending an uplink request and the demodulation
7 method used by the client to the transmitter.

1 16. The scalable QAM communication system according to
2 claim 15, wherein the transmitter builds a client database after
3 receiving the uplink request from a client to complete
4 registration, and the transmitter sends packets for the client
5 using a MAC message with a corresponding type.